

Smart Growth/Smart Energy  
Conference  
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Boston, Massachusetts

# LID Performance Studies Massachusetts Stormwater Technology Evaluation Project [www.mastep.net](http://www.mastep.net)

Massachusetts Stormwater Technology Evaluation Project  
University of Massachusetts



[www.mastep.net](http://www.mastep.net)



## The Clearinghouse:

The Massachusetts Stormwater Technology Evaluation Project (MASTEP) has created this web site to host a source of verified technical information on stormwater Best Management Practices (BMPs) to provide information on innovative technologies to BMP users. [More...](#)

**MASTEP has changed its performance data review process. All technologies have been re-evaluated and scored according to the new system. For more information, go to the [Database Documentation](#) page.**

### You will find on this site:

- A [searchable database](#) of innovative technologies.  
We have removed the registration requirement to view the database, but invite you to [register](#) anyway. ([Why?](#))
- A [Data Entry Tool](#) for submitting technology specification and performance data to MASTEP. Once data is submitted, MASTEP applies a [screening protocol](#) to rate technologies based on validated studies. Vendors: In order to enter a profile for your BMP, you must first [register](#) and log in.
- [Documents](#) and [links](#) to relevant resources for structural controls and general information on BMP technologies and stormwater monitoring techniques
- [Information](#) on this project and how to [contact the staff](#)

### More about the database:

Click on the Search Database button under Database on the navigation bar above, which takes you to the searchable database web page. You can search BMPs by keyword or do an advanced search by manufacturer, pollutant treated, verification rating, BMP category, application type, or any combination of the above. Once you have selected your search parameters, a list of BMPs will appear on your screen, with links to each technology detailing its applications, test status, performance, etc. (as in the image at right).



Click on image to start exploring the database

## Arkal Pressurized Stormwater Filtration System :: A product from [ARKAL FILTRATION SYSTEMS](#) ::

**Performance information:** [\(This product was evaluated in at least one third-party study. See MASTEP Evaluation Summary.\)](#)

The Arkal Stormwater Filtration System was tested in the Environmental Technology Verification Program. The manufacturer's performance claim was restricted to TSS, but the study tested removal of a suite of parameters, including solids, metals, and nutrients. The product performed well for most constituents in a generally solid study, but an insufficient amount of rainfall was monitored to satisfy TARP requirements. Bypass was not monitored because it was never encountered during the study. The Arkal system was evaluated by the USEPA and NSF International and has received an Environmental Technology Verification (April 2004).

Pollutants addressed	Manufacturer's Removal Efficiency claim	Minimum particle size	Tested removal efficiency (*)	Test Data Status (**)	Notes
Total suspended solids	80%	5 µm	82 %	2	Evaluated in ETV study
Zinc	-	-	58 %	2	Evaluated in ETV study
Total Phosphorus	-	-	55 %	2	Evaluated in ETV study
Total Keldhal Nitrogen	-	-	26 %	2	Evaluated in ETV study
Total dissolved solids	-	-	-190 %	2	Evaluated in ETV study
Suspended sediment concentration	-	-	82 %	2	Evaluated in ETV study

# Reasons for lower ratings

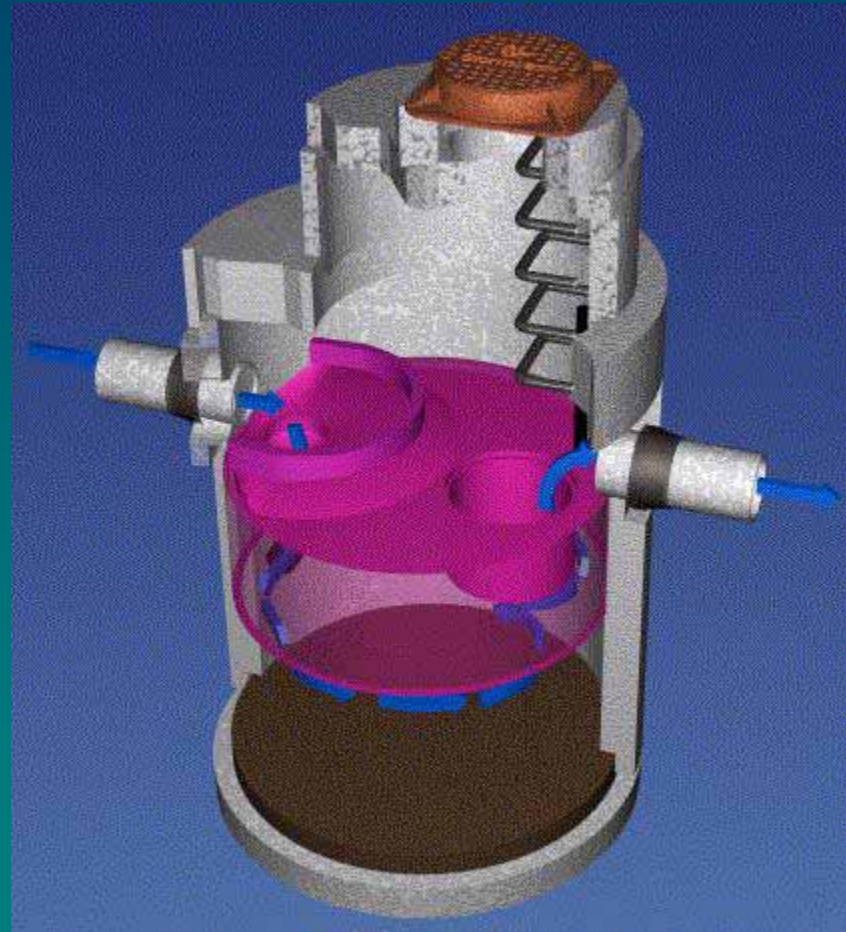
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- Narrow / inappropriate focus
- Small sample size
- Inadequate documentation
- Faulty methods





# Proprietary BMPs - Advanced Sedimentation



Rinker Inc, 2002





# Filterra Bioretention Systems



Product Name	BMP Type	Infiltration	TSS removal	Nutrient removal	Bacteria	Petroleum Products	Metals	Comments
Jordan Cove Watershed Project	LID-integrated Development	Tripled over 3 years	-197%	(-939%)- (-44%)	95%		25-77%	Compared pre vs post development pollutant levels. 22 % increase imperv surface over this time.
LID Development Cross Plains WI	LID-integrated Development	95%	% removal not calc'd	% removal not calculated				
St.Francis Residential Subdivsion- Brewery Creek WI	LID-integrated Development	60%	not statistic. Signifif.	n/a				
Bioretention Cell- Parking Lot NC	LID-Biofilter	96% peak flow reduction	60%	32%-72%	69-71%		31.4-77%	
Bioretention Cell Parking lot and Mall	LID-Biofilter	78%	-70%%	-240% - 86%				Hi P index in soils contribute to TP increase.
Rain Garden Bioretention LID Haddam CT	LID-Biofilter	99% reduction surface runoff*		-108% to 82%				*95% flow exited through underdrain, 3% evapotranspiration
BioRetentoin Traffic Island Villanova	LID Biofilter	86%		-48% - 100%			-36% - 100%	
Bioretention Column - lab studies	LID Biofilter		29% - 96%%	-54% - 99%		97%	66% - 98%	Tested different configurations
Grass Swales - with and without pretreatment	LID Biofilter		65% - 71%				30% - 60%	
Filterra Stormwater Bioretention Filtration System	LID-Biofilter - Proprietary		80%	-357% to 90%	n/a	n/a	-286% to 86% - many samples below PQL	



Product Name	BMP Type	Infiltration	TSS removal	Nutrient removal	Bacteria	Petroleum products	Metals	Comments
LID Mixed - Grass swales, garden, permeable pavement - parking lot	Porous Pavement, swale, biofilter	40% (30% swale, 10% perm pavement)	71% - 92%%	-77% - 80%			41% - 94%	Results inconsistent, but some question of reduced TSS removal efficiency year 2
Porous Pavement Overlay Austin TX -3	Porous Pavement		94%%	43%			75-93%	
Permeable Pavement - concrete, gravel, geotextile - lab study	Porous Pavement					98%		300 day study. Included test of fertilizer introduction to increase microbial activity.
Porous Pavement Parking Lot Walden Pond	Porous Pavement	72% - 84%						Insufficient WQ data. Some recharge value demonstrated. Good discussion of construction, maintenance.

# Contacts

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